
APPENDIX A

DAWN MORTALITY DATA COLLECTION

DAWN data collection

DAWN mortality data are collected in participating medical examiner and coroner offices through a retrospective review of case records for every death investigated by the medical examiner or coroner. Families are never interviewed. The review of source records is performed by a trained DAWN reporter in each member facility. Depending on the needs of the facility, the DAWN reporter may be an employee of the death investigation jurisdiction or an employee of the DAWN operations contractor.

Within each facility that participates in DAWN, the designated DAWN reporter reviews all death records to identify deaths related to drug use. The DAWN reporter submits an electronic case report to the DAWN system for each death that meets the specific case selection criteria.

Deaths eligible for DAWN

A DAWN case is any death related to recent drug use. DAWN includes deaths associated with substance abuse and misuse, both intentional and accidental. DAWN also includes deaths related to the use of drugs for legitimate therapeutic purposes. To be a DAWN case, the relation between the death and the drug need not be causal; the drug needs only to be implicated in the death.

The case criteria are intended to be broad and inclusive and to have few exceptions. DAWN cases are found through a retrospective review of death records.¹ Broad criteria take into account the fact that documentation in death records varies in clarity and comprehensiveness across medical examiners/coroners. Broad criteria minimize the potential for judgments that could cause data to vary systematically and unexpectedly across reporters and jurisdictions. In addition, broad criteria are designed to capture a very diverse set of drug-related deaths, which can be aggregated and disaggregated to serve a variety of analytical purposes and the interests of multiple audiences. In DAWN, only recent drug use is included,² and the reason a patient used a drug is irrelevant.

There are some clearly delineated exceptions to the DAWN case criteria. A death is *not* a DAWN case if:

- There was no evidence of recent drug use.
- The death was not processed by a medical examiner or coroner.
- The decedent was a drug user, but died of natural causes unrelated to the drug use.

¹ This review is conducted by “DAWN reporters” described above.

² That is, patients with a history of drug use (and no recent use) are excluded.

- The decedent was a homicide victim but the method of homicide was not poisoning by drugs.
- The decedent consumed a nonpharmaceutical substance but did not inhale it.
- The death involved inhalation of carbon monoxide and no other reportable substance.
- The decedent had a history of drug use but no recent use.
- Alcohol was the only substance involved and the decedent was an adult (age 21 or over).
- The only documentation of drug involvement was in toxicology test results.
- The only drugs listed (e.g., current medications) were not related to the death.
- The death was a consequence of undermedication, i.e., taking too little of a drug.

Data items collected by DAWN

The case report form showing all the data items collected by DAWN is provided in Figure A-1. This is a representation of the form on paper, whereas all DAWN data are submitted electronically. The electronic system, for example, permits the submission of more drugs than are shown on the paper form.

Manner of death in DAWN

Manner of death is a particularly important part of the death records because it is used to determine if the death is a case of drug misuse/abuse. As depicted in Figure A-2, the DAWN Decision Tree, each death is assigned to one of seven manners of death as follows:

- Suicide;
- Homicide by drug;
- Accidental ingestion;
- Adverse reaction;
- Overmedication;
- All other accidental; and
- Could not be determined.

Each DAWN case is assigned to one, and only one, of the seven manner of death categories based on the series of questions and decision rules depicted in the decision tree. Starting at the top, each case is assigned to the first manner of death that applies, even if the case might also meet the rules for a subsequent category. The seven categories were ordered with this in mind.

The final two categories, *all other accidental* and *could not be determined*, were designed to capture all of the drug-related deaths that could not be classified in any of the prior case types. *Could not be determined* cases include those that are ruled by the ME/C explicitly as “could not be determined” (i.e., the evidence was inconclusive with regard to whether the death was accidental, suicide, or homicide).

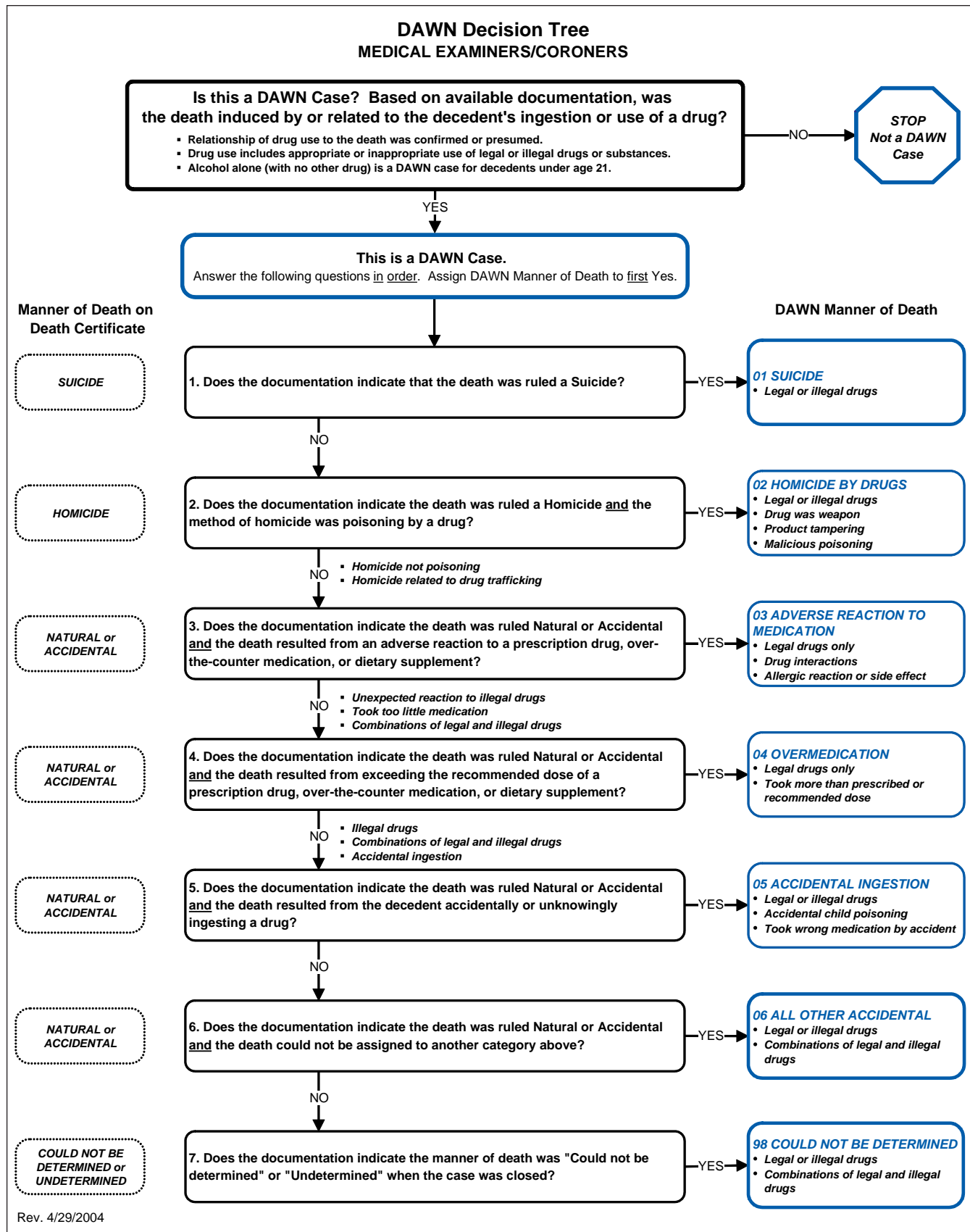
Figure A-1. DAWN case form

FOR SAMHSA USE ONLY FORM NUMBER		Department of Health and Human Services ■ Substance Abuse and Mental Health Services Administration		FORM APPROVED OMB. NO. 0930-0078 EXPIRES 12/31/2005	
Drug Abuse Warning Network (DAWN) Medical Examiner Case Form					
1. Facility ID		2. Cross-reference (for facility use only)			
INFORMATION ON DECEASED					
3. Date of Death		4. Sex		5. Age	
<div style="display: flex; justify-content: space-around;"> <div>MONTH <div style="border: 1px solid black; width: 20px; height: 20px;"></div></div> <div>DAY <div style="border: 1px solid black; width: 20px; height: 20px;"></div></div> <div>YEAR <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;">2</div><div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;">0</div></div> </div>		<div style="display: flex; flex-direction: column;"> <div>1 <input type="checkbox"/> Male</div> <div>2 <input type="checkbox"/> Female</div> <div>8 <input type="checkbox"/> Not documented</div> </div>		<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="margin-left: 5px;"> 1 <input type="checkbox"/> Less than 1 year 8 <input type="checkbox"/> Not documented </div> </div>	
6. ZIP Code of Decedent's Last Residence		7. Place of Death		8. ZIP Code for Place of Death	
<div style="border: 1px solid black; width: 40px; height: 20px; margin-bottom: 5px;"></div> Otherwise, mark [x] one: 1 <input type="checkbox"/> No fixed address (e.g., homeless) 2 <input type="checkbox"/> Institution (e.g., shelter/jail/ hospital) 8 <input type="checkbox"/> Not documented		Mark [x] one: 01 <input type="checkbox"/> Emergency department 02 <input type="checkbox"/> Other health care facility 03 <input type="checkbox"/> Decedent's home 04 <input type="checkbox"/> Public place 96 <input type="checkbox"/> Other 98 <input type="checkbox"/> Not documented		<div style="border: 1px solid black; width: 40px; height: 20px; margin-bottom: 5px;"></div> 8 <input type="checkbox"/> Not documented	
				9. Race/Ethnicity	
				Mark [x] one or more: <input type="checkbox"/> White <input type="checkbox"/> Black or African American <input type="checkbox"/> Hispanic or Latino <input type="checkbox"/> Asian <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> Not documented	
10. Factors Supporting DAWN Case Determination			11. Cause of Death		
Check all that apply: <input type="checkbox"/> Death certificate <input type="checkbox"/> Toxicology lab report <input type="checkbox"/> Autopsy <input type="checkbox"/> External physical signs <input type="checkbox"/> Inspection of scene of death <input type="checkbox"/> Statement of physician/family/friends <input type="checkbox"/> Other information			List the chain of events causing the death. Do not abbreviate. Do not use ICD codes. (Part I) Immediate cause: As a result of As a result of As a result of (Part II) Other significant conditions: 		
12. Manner of Death		13. Drug Involvement in Death			
Mark [x] one: 01 <input type="checkbox"/> Suicide 02 <input type="checkbox"/> Homicide by drugs 03 <input type="checkbox"/> Adverse reaction to medication 04 <input type="checkbox"/> Overmedication 05 <input type="checkbox"/> Accidental ingestion 06 <input type="checkbox"/> All other accidental 98 <input type="checkbox"/> Could not be determined		Mark [x] one: 1 <input type="checkbox"/> Drug-induced: drug(s) directly caused the death 2 <input type="checkbox"/> Drug-related: drug(s) contributed to the death If drug-related, mark one: 1 <input type="checkbox"/> confirmed 2 <input type="checkbox"/> presumed			
14. Substance(s) Involved					
Using available documentation, list all substances that caused or contributed to the death. Record substances as specifically as possible (i.e., brand [trade] name preferred over generic name preferred over chemical name, etc.). Do not record the same substance by two different names.					
SAMHSA USE ONLY		Substance (record verbatim)		Route of Administration	
				Circle one:	
				<div style="display: flex; justify-content: space-around; font-size: small;"> <div>Mark [x] if confirmed by toxicology test</div> <div>Oral</div> <div>Injected</div> <div>Inhaled, sniffl, shorted</div> <div>Smoked</div> <div>Other</div> <div>Not documented</div> </div>	
1				<input type="checkbox"/>	1 2 3 4 5 8
2				<input type="checkbox"/>	1 2 3 4 5 8
3				<input type="checkbox"/>	1 2 3 4 5 8
4				<input type="checkbox"/>	1 2 3 4 5 8
5				<input type="checkbox"/>	1 2 3 4 5 8
6				<input type="checkbox"/>	1 2 3 4 5 8
7	C	2	0	0	0
8	2	9			
		Alcohol involved? 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 8 <input type="checkbox"/> Not documented		<input type="checkbox"/>	
				1 2 3 4 5 8	

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SEE BURDEN STATEMENT ON BACK

Figure A-2. DAWN decision tree



Drugs included in DAWN

DAWN includes all types of drugs.³ Drugs in DAWN include:

- Illegal drugs, such as heroin, cocaine, marijuana, and Ecstasy;
- Prescription drugs, such as Prozac[®], Vicodin[®], OxyContin[®], alprazolam, and methylphenidate;
- Over-the-counter (OTC) medications, including aspirin, acetaminophen, ibuprofen, and multi-ingredient cough and cold remedies;
- Dietary supplements, including vitamins, herbal remedies, and nutritional products;
- Psychoactive, nonpharmaceutical inhalants;
- Alcohol in combination with other drugs; and
- Alcohol alone, in patients aged less than 21 years.

To be reportable, a nonpharmaceutical substance must be consumed by inhalation, sniffing, or snorting, and it must have a psychoactive effect when inhaled. A death involving inhalation of a nonpharmaceutical, psychoactive substance and no other drug qualifies as a DAWN case. Carbon monoxide is excluded from the inhalants, as noted above. Beginning in 2004, deaths involving accidental exposures (e.g., exposure to paint fumes while painting a closet) are excluded as well.

DAWN features that enhance data quality and reliability

Several methods are used to improve the quality and reliability of DAWN data. These include:

- Case finding by a retrospective review of death records for every death investigated by a participating medical examiner or coroner;
- Electronic reporting with automated prompts and data validation;
- Elimination of incidental drug reporting;
- Accurate, specific, and nonredundant drug reporting;
- Inclusion of data items to identify drugs confirmed by laboratory testing;
- Rigorous training and certification of DAWN reporters; and
- In-house review and cleaning of DAWN case reports.

In addition to these steps, each ME/C receives a summary of the drug-related deaths submitted for each of his or her jurisdiction(s) after the data for the year are closed out. This final step provided an opportunity for the ME/Cs to approve or reject the data used for this publication. Any rejected data are reconciled to the satisfaction of the ME/C before they are used in this publication.

³ The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2005, Multum Information Services, Inc. The classification schema was modified to meet DAWN's unique requirements (2006). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix C and can be found on the Internet at <http://www.multum.com>.

Participation of medical examiners and coroners

ME/Cs participate in DAWN on a voluntary basis and constitute neither a sample nor a census of ME/Cs in the United States. ME/Cs are invited to join DAWN based on their location in selected metropolitan areas. Recruitment efforts focus primarily on areas where DAWN data are also collected from hospital emergency departments. In addition to recruitment targeted at metropolitan areas, DAWN has added States with centralized medical examiner systems to gain a better understanding of drug-related mortality outside of the targeted metropolitan areas.

A death investigation jurisdiction typically corresponds to a county. In the rare instances with multiple jurisdictions in a single county, the jurisdictions are combined and reported at the county level. For participating states, every county within the state is included in DAWN.

The metropolitan-area definitions used in this publication are those established by the Office of Management and Budget (OMB) and updated in 2003. These definitions can be found in the OMB publication *Revised Definitions of Metropolitan Statistical Areas, New Definitions of Micropolitan Statistical Areas and Combined Statistical Areas, and Guidance on Uses of the Statistical Definitions of These Areas*, Bulletin No. 03-04, June 6, 2003, which can be accessed at <http://www.whitehouse.gov/omb/bulletins/b03-04.html>.

APPENDIX B

GLOSSARY OF TERMS

This glossary defines terms used in data collection activities, analyses, and publications associated with the mortality component of the Drug Abuse Warning Network (DAWN).

Accidental ingestion: This category includes deaths resulting from accidentally or unknowingly ingesting a drug as denoted by ME/C.

Adverse Reaction to Medication: This category was designed to capture natural or accidental deaths as the result from an adverse reaction to a prescription drug, over-the counter medication, or dietary supplement.

All other accidental: See **Drug Misuse**.

Body systems: Refers to neurological, cardiovascular, gastrointestinal, genitourinary, respiratory, musculoskeletal, skin and soft tissue, lymphatic, endocrine, head and neck, abdominal and/or multi-system conditions identified in the chain of events that led to the drug-related death. (See also **Cause of death**.)

Case type: See **Manner of death**.

Cause of death: The chain of events (diseases, injuries, or complications) that caused the death, as recorded on the death certificate. A death can have multiple causes. The immediate cause is listed first and is followed by contributing causes listed sequentially, ending with the underlying cause. Other significant conditions that contributed to the death are listed separately.

Coroner (C): Death investigation jurisdictions typically use either a medical examiner system or a coroner system. Unlike medical examiners, coroners need not be physicians; usually the only prerequisite for serving as a coroner is that the individual be more than 18 years of age and a resident of the county or district to be served. Coroners are typically elected rather than appointed. They may have jurisdiction over counties or districts within states. (See also **Jurisdiction** and **Medical examiner**.)

Could not be determined: See **Drug Misuse**.

Drug: This refers to a substance that was recorded in a DAWN case report. Substances accepted by DAWN include alcohol, illicit drugs, prescription and over-the-counter pharmaceuticals, dietary supplements, and nonpharmaceutical inhalants. Multiple substances ("drugs") can be reported for each DAWN case. Therefore, the total number of drugs exceeds the total number of DAWN cases reported. (See also **Single-drug case**.)

Drug category: A generic grouping of related pharmaceuticals or other substances reported to DAWN, based on the classification of Multum Information Services. Multum Information Services, a subsidiary of the Cerner Corporation, is a developer of clinical drug information systems and a drug knowledge base. More information is available at <http://www.multum.com/>. In general, the Multum categories follow the therapeutic uses for prescription and over-the-counter pharmaceuticals.

Additional clarification is provided for the following drug categories:

- *Alcohol alone*—DAWN collects data on alcohol when used alone if the decedent is under age 21.
- *Alcohol-in-combination*—Alcohol-in-combination is the category for alcohol present in combination with another reportable substance. DAWN does not gather data on alcohol used alone if the decedent is over age 21. For decedents 21 and older, alcohol must be used with another substance to be reported. Alcohol-in-combination is reportable for all ages.
- *Stimulants*—This category includes amphetamines and methamphetamine. Since some drug screens test for amphetamines only as a class, an amphetamine-positive result could indicate amphetamine or methamphetamine. For this reason, amphetamines and methamphetamine are combined for analysis into the category “stimulants.” This category does not include other CNS stimulants, such as caffeine or methylphenidate.
- *Inhalants*—This category includes anesthetic gases and psychoactive nonpharmaceutical substances for which the documented route of administration was inhaled, sniffed, or snorted. Accidental exposure to nonpharmaceutical inhalants (e.g., overcome by paint fumes while painting a closet) are no longer included as DAWN cases. Psychoactive nonpharmaceuticals fall into one of the following 3 categories: **(1) volatile solvents**—adhesives (model airplane glue, rubber cement, household glue), aerosols (spray paint, hairspray, air freshener, deodorant, fabric protector), solvents and gases (nail polish remover, paint thinner, correction fluid and thinner, toxic markers, pure toluene, cigar lighter fluid, gasoline, carburetor cleaner, octane booster), cleaning agents (dry cleaning fluid, spot remover, degreaser), food products (vegetable cooking spray, dessert topping spray such as whipped cream, whippets), and gases (butane, propane, helium); **(2) nitrites**—amyl nitrites (“poppers,” “snappers”) and butyl nitrites (“rush,” “locker room,” “bolt,” “climax,” “video head cleaner”); or **(3) chlorofluorohydrocarbons** (freons). Anesthetic gases (e.g., nitrous oxide, ether, chloroform) are presumed to have been inhaled.
- *Opiates/opioids*—This category includes opiates (narcotic substances derived from opium) and opioids (semi-synthetic and synthetic substances with similar narcotic properties). The category is subdivided into **(1) “heroin (specified),”** which only includes specific reports of heroin, **(2) methadone,** whether used in the treatment of opiate addiction or pain, and **(3) “all other opiates/opioids,”** which includes nonspecific reports of “opiates” and specific named substances, such as codeine, morphine, fentanyl, hydrocodone, oxycodone, and others.

Drug misuse/abuse: A group defined broadly to include case types related to drug misuse or abuse. Additional clarification is provided for the following case types:

- *Overmedication*—This category was designed to capture nonmedical use, overuse, and misuse of prescription and OTC medications when this use was not documented as drug abuse.
- *Homicide by drug*—This category was designed to capture malicious poisonings, that is, the decedent was administered a drug by another person for a malicious purpose. Only cases assigned a manner of death by homicide by the ME/C are classified in this category.
- *All other accidental*—This category includes all cases denoted by the ME/C as natural or accidental that could not be assigned to any of the other five case types. By design, most cases of documented drug abuse will fall into this category.
- *Could not be determined*—This category includes all cases with a manner of death denoted by the ME/C as could not be determined. This manner of death is assigned by the ME/C when a definitive ruling of suicide, homicide, natural, or accidental death is not possible.

Drug-related death: Any death related to recent drug use. To be a DAWN case, a drug needs only to be implicated in the death; the drug does not have to have caused the death. Even if only one drug is reported, it should not be assumed that the substance was the sole and direct cause of the death. (See also **Single-drug case**.) Drug-induced deaths are those for which the drug(s) directly caused the death.

Homicide: See **Drug Misuse**.

Jurisdiction: DAWN uses the term “jurisdiction” to mean the geographic area for which a medical examiner’s or coroner’s office is responsible. In many States, there is a one-to-one correspondence between jurisdictions and counties. In some States, there are multiple jurisdictions within a given county, or there may be multiple counties covered by a “district” that includes one or more medical examiner or coroner offices. Some States are organized as a single statewide jurisdiction.

Understanding jurisdictions is important because this assists readers in interpreting aggregated data. For publication, DAWN mortality data are aggregated into metropolitan areas, which often comprise multiple jurisdictions. In some States, there are different death investigation procedures for different jurisdictions (most notably, some jurisdictions have medical examiner systems, while others have coroner systems). There are nearly always some differences in death investigation procedures across States (and notably, some metropolitan areas include jurisdictions in multiple states). Readers should be mindful of these variations when interpreting or comparing data.

Manner of death: A classification used to group similar DAWN cases. Each case is coded into one and only one category, the first that applies from the following hierarchy: suicide, homicide by drugs, adverse reaction to medication, overmedication, accidental ingestion, all other accidental, and could not be determined. The manner of death categories used by DAWN draw from but do not duplicate the manner of death recorded on the death certificate. (See **DAWN Decision Tree**.)

Medical examiner (ME): Death investigation jurisdictions typically use either a medical examiner system or a coroner system. Most medical examiners are licensed physicians or forensic pathologists and are generally appointed (rather than elected). They may have jurisdiction over a county, district, or an entire State. (See also **Coroner** and **Jurisdiction**.)

Metropolitan area: An area comprising a relatively large core city or cities and the adjacent geographic areas. Conceptually, these areas are integrated economic and social units with a large population nucleus. This DAWN publication utilizes areas defined by the Office of Management and Budget (OMB) in 2003, based on population data from the 2000 decennial Census.

Overmedication: See **Drug Misuse**.

Place of death: The location that best describes where the death occurred. The place of death categories on the DAWN data collection form are:

- *Emergency department*—The death occurred in a hospital emergency department.
- *Other health care facility*—The death occurred in a hospital unit other than an emergency department, nursing home, hospice, or any other health care institution in which the decedent was receiving care.
- *Decedent’s home*—The death occurred at the decedent’s home, apartment, or other dwelling.

- *Other*—The location of death was documented in the source record but does not fit into any of the preceding categories.
- *Not documented*—The location of death was not available in the source record.

Race/ethnicity: The Office of Management and Budget (OMB) is responsible for standard protocols for the collection of data on race and ethnicity by federal systems, including DAWN. In October 1997, OMB issued a revised standard protocol, which permitted separate reporting of race and Hispanic ethnicity, the ability to capture more than one race for an individual, modifications in nomenclature (e.g., “Black” was changed to “Black or African American”), division of certain categories (“Asian or Pacific Islander” was split into two categories, “Asian” and “Native Hawaiian or Other Pacific Islander”), and elimination of the “Other” category. For data collections, such as DAWN, where self-identification of the individual is not feasible, the revised OMB protocol also permitted a combined format, whereby race and Hispanic ethnicity would be recorded in a single data item, which could still record multiple entries for race and/or Hispanic ethnicity.

Since January 2003, DAWN has collected data on race/ethnicity using the combined format. The race/ethnicity categories on the DAWN data collection forms are as follows:

- *White*—A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
- *Black or African American*—A person having origins in any of the black racial groups of Africa.
- *Hispanic or Latino*—A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.
- *Asian*—A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- *American Indian or Alaska Native*—A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
- *Native Hawaiian or Other Pacific Islander*—A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- *Not documented*—Used when documentation of race is not available from source records.

Despite the increased detail allowed by these categories and the provision for multiple entries, the actual race/ethnicity data reported to DAWN is quite limited because race and ethnicity are often not documented with this level of specificity in patient/decedent records. As a result, the classification used to tabulate DAWN data has a more limited set of categories, as follows:

- *White*—Anyone meeting the definition of white (above). Those who are identified as white and Hispanic are classified as Hispanic.
- *Black*—Anyone meeting the definition of black or African American (above). Those who are identified as black or African American and Hispanic are classified as Hispanic.
- *Hispanic*—Anyone whose ethnicity is Hispanic or Latino (above) is placed in the category Hispanic, regardless of race.
- *Race/ethnicity NTA*—This includes those categories that are too small to report independently including: 2 or more races, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander.
- *Unknown*—Race/ethnicity is unknown. Those who are identified only as Hispanic are classified as Hispanic.

Single-drug case: A single-drug case is one in which only one drug was involved. Because multiple substances may be recorded for each DAWN case (see **Drug**), readers should be cautious in interpreting the relationship between a given drug and the number of associated visits or deaths. For example, if the source record for a patient/decedent documented marijuana use, this does not mean that marijuana was the only drug involved in the visit/death or that the marijuana caused the visit/death. One should always consider whether and how many other drugs were used in combination. Even then, attributing a causal relationship between the visit/death and a particular drug may not be possible. DAWN only captures single-drug visits/deaths involving alcohol if the decedent was younger than age 21.

Suicide: This category includes cases denoted by the ME/C as suicide if the decedent took their own life and legal or illegal drugs had been involved: drug use need not have been the cause of death.

Toxic effects: Injury, illness, or damage that can be attributed to the ingestion of a drug. (See also **Cause of death**.)

APPENDIX C

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